

Chapter 8.7

Status of horseshoe crab, *Limulus polyphemus*, populations in the Maryland Coastal Bays

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Introduction

Horseshoe crabs, *Limulus polyphemus*, are characterized by high fecundity, high egg and larval mortality and low adult mortality (Botton and Loveland 1989; Loveland et al. 1996). They spawn multiple times per season and per tide, laying approximately 3,600 to 4,000 eggs in a cluster (Schuster 1950; Shuster and Botton 1985). Based on different methods of estimating maximum age, adults may live as long as 16 to 19 years. Populations are influenced by harvesting levels, habitat loss and shorebird predation.

During the first half of the 20th century, threats to the horseshoe crab included overharvesting primarily for fertilizer and animal feed. Large numbers of crabs were collected on mid-Atlantic beaches or in nets during the spawning season to meet this demand. However, most of the evidence of over-harvesting is anecdotal because historical data on horseshoe crab harvests is often incomplete. Watermen were not required to report their catch until the late 1990's.

The threats to horseshoe crab populations have changed dramatically. Since the early 1990's, horseshoe crabs have been harvested as bait to catch American eel (*Anguilla rostrata*) and whelk (*Busycon* spp.) in Maryland and the rest of the mid-Atlantic region. The increases in horseshoe crab harvests throughout the late 1990's are a result of an expanding whelk fishery. Increasing demand for whelk in Asian and European markets was the driving force behind the expansion.

In addition, horseshoe crabs are used for the biomedical industry. The blood of the horseshoe crab is not only unique but it provides a valuable medical product critical to maintaining the safety of many drugs and devices used in medical care. A protein in the blood called Limulus Amebocyte Lysate (LAL) is used by pharmaceutical and medical device manufacturers to test their products for the presence of endotoxins, bacterial substances that can cause fevers and even be fatal to humans. A horseshoe crab's blood has a blue to blue-green color when exposed to the air. The blood is blue because it contains a copper-based respiratory pigment called hemocyanin.

Development of coastal habitat has increasingly become an important issue for horseshoe crabs. Sandy beaches are essential spawning habitat for horseshoe crabs and nearshore

shallow water habitats (i.e., mud and sand flats) are important nursery grounds for juvenile crabs. Human activities can reduce the available habitat horseshoe crabs need for reproduction and larval development to maintain their populations over time. Several types of shoreline erosion control structures commonly used to protect property reduce available spawning habitat. These structures include bulkheads, groins and rip rap. Each of these shoreline control structures, commonly referred to as “armoring” or “hardening”, is designed to protect the shoreline from the effects of erosion. However, they also block access to spawning beaches, eliminate sandy beach habitat, or entrap and strand spawning crabs during times of high wave energy. Coastal development activities combined with shoreline erosion are contributing to the continued deterioration of coastal habitats essential to spawning horseshoe crab populations.

Data Sets

DNR data on north Assateague Island ongoing.
Volunteer monitoring program ongoing.

Horseshoe crab Indicator: *none*

Status of horseshoe crab

The status of the horseshoe crab population in Maryland and the Atlantic Coastal Bays at this time is unknown. Efforts are underway to conduct population assessments through an interstate Federal Management Plan (FMP) under the auspices of the Atlantic States Marine Fisheries Commission (ASMFC). Seasonal and state harvest restrictions are currently in place.

The Interstate Fishery Management Plan for Horseshoe Crabs was approved by the ASMFC on October 22, 1998. The FMP is designed as a tool to guide individual States to conserve and protect the horseshoe crab resource at a population that sustains its ecological and economic benefits. Contained within the FMP are requirements for managing the horseshoe crab harvests and monitoring populations.

Requirements of the Horseshoe Crab FMP Addendum 1 include:

- States must reduce horseshoe crab landings to 25% below their reference period landings.
- State with more restrictive harvest limits are encouraged to maintain those limits.
- Encourage the NMFS to establish a horseshoe crab sanctuary at the mouth of the Delaware Bay estuary.

Recommendations of Horseshoe Crab FMP Addendum 2 include:

- Allow for the voluntary transfer of harvest quotas between states.

The complete Coast-wide FMP for horseshoe crabs can be found at ASMFC.

Summary

Horseshoe crabs are an important role in the ecosystem as well as an important commercial fishery. The status of the horseshoe crab population along the Atlantic coast is of great concern. The species serves as a primary bait source for several important commercial fisheries and is the backbone of a major medical process. Migratory and local shorebirds feed on horseshoe crab eggs in areas of high spawning densities and are considered essential to some birds. Despite significant shorebird predation on the eggs, such activity probably has little impact on the horseshoe crab population (Botton et al. 1994) compared to vanishing habitat in the Coastal Bays.

References

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